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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/643,160 | 08/18/2003 | Dmitry M. Rudkevich | 124263-1016 | 3568 |

7590 03/27/2007

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| EXAMINER | |
|---|---|
| DRODGE, JOSEPH W | |
| **ART UNIT** | **PAPER NUMBER** |
| 1723 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|---|---|---|
| 3 MONTHS | 03/27/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/643,160 | RUDKEVICH, DMITRY M. | |
| | Examiner | Art Unit | |
| | Joseph W. Drodge | 1723 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *09 February 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) *21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *23* are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamartine et al patent 6,136,071 in view of Rounbehler et al patent 4,249,904.

Lamartine et al, of record, discloses devices employing calix[4]arene compounds (column 5, about line 40), that may be used to purify fluid streams containing nitrogen-containing substances (column 2, lines 32-37), and by a capturing, complexation mechanism (column 5, lines 19-20). The devices absorb or adsorb and form complexes with captured contaminants (column 5, lines 19-21). The contaminants complexed are said to include ammonia, amines, hydrogen sulfide and other nitrogen-containing compounds, especially light-weight nitrogen, gaseous compounds, generally (see

column 2,lines 32-37 and lines 51-61) where it is also stated that the explicitly disclosed lists of gaseous contaminants complexed and sorbed "is not exhaustive".

The formed complex is considered "well-defined" and crystallizable, hence "stable" (column 5, lines 17-26). The complex is also reversible, the complexed amine or other gaseous volatile compounds may be disassociated by various methodology (column 6, line 65-column 7, line 26). A device containing an air stream having the claimed calix[4]arene compound and it's formed complex with gas compounds may be part of a device for sensing contaminant level in a sample thus that the complex is detectable by a color change, such as by chromatography (column 7, line 47-column 8, line 51).

The claims differ in requiring that the calix4arene compound be capable of complexing with, actually complex with, NOX compounds, other than nitric oxide. Rounbehler et al teach adaptation of complexing agents that may comprise amine-based sorbents to varying uses including sensor/sampling systems and air purifying or filtering agents (column 7, lines 3-11 and column 9, lines 49-56). The complexing sorbents of Rounbehler are capable of reversibly complexing with {reversibly complex with} and sorbing gaseous compounds (column 8, lines 32-39) containing both an amine entity and an NO entity (column 6, lines 5-29 concerning N-nitroso amine compounds). It would have been obvious to one of ordinary skill in the art to have adapted the complexing agent of the Lamartine device to adsorb N-nitroso amine compounds, as suggested by Roundbehler, since these are commonly formed contaminants of fuel or industrial polluted air, are chemically related to the compounds disclosed as being complexed by the Lamartine device and are amenable to disassociation so as to be readily sampled and tested or sensed.

Regarding various dependent claims, Lamartine also discloses the calixarene being coupled to a substrate or solid support (Abstract) [as in claims 6,9,12 and 18], and its forming a storage device (column 4, lines 46-47 concerns it's capturing nitrogen-containing compounds [as in claims 8,13 and 17].

The limitations of dependent claims pertaining to association with a particular nitrogen-containing compound (NO+), complexing being stabilized with Lewis Acids, periods of being chemically stable, and deriving of NO+ from an oxide of nitrogen in a form other than nitric oxide have each been given little patentable weight, since no

nexus is seen between particular processes that result in the presence of NO+ contaminants in fluids and properties of the calixerene compounds utilized to sense, contain or purify NO+ from fluid mixtures containing same.

With regard to each of independent claims 1,11,15 and 16, the limitation "wherein NO+ is derived from an oxide of nitrogen in a form other than nitric oxide" is considered a product-by-process limitation, and now deemed to be of limited patentable weight, since no nexus is seen between particular processes that result in the presence of NO+ contaminants in fluids and properties of the calixerene compounds utilized to sense, contain or purify NO+ from fluid mixtures containing same.

When the reference teaches a product that appears to be the same as, or an obvious variant of, the product set forth in a product-by-process claim although produced by a different process. See In re Marosi, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983) and In re Thorpe, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). See also MPEP § 2113.

When the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to applicant to establish that their product is patentably distinct and not the examiner to show the same process as making. *In re Brown*, 173 USPQ 685 and *In re Fessmann*, 180 USPQ 324.

Claims 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Batelaan et al patent 5,434,208 in view of either Holdcroft et al patent 5,561,030 or Smith et al patent 6,605,236.

Regarding claims 19 and 20, Batelaan et al patent 5,434,208 discloses an optical waveguide or optical switch (column 1, lines 29-32), comprising calix[4]arene (column 3, lines 24-26), and forming of "guest-host systems (hence complexes)-(see column 2, lines 14-16 and column 3, lines 20-26). The calix[4]arene may be complexed with nitrogen-containing compounds (column 5, lines 15-31). The formed complexes are considered highly stable (column 9, lines 11-13), however to an extent also reversible (column 9, lines 7-9 concerning reversing of 35% of an originally formed complex). For

claims 21 and 22, the calix[4]arene compound may be immobilized as a thin film on a substrate (column 8, lines 55-57).

Claims 19-22 differ in requiring the complexing to be with a nitrosonium cation. However, both Holdcroft et al (column 13, lines 30-35 and column 14, lines 63-67) and Smith et al ( column 1, lines 33-35 and column 2, lines 40-63) teach combinations/co-polymers/complexes of materials useable for creating optical switches that contain nitrosonium complexes. It would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized a nitrosonium cation as the nitrogen-containing compound being complexed to the calixarene of the Batelaan optical switch, as taught by Holdcroft et al or Smith et al, since nitrosonium has the beneficial properties of imparting controlled conductivity or semiconductivity to the optical switch or similar type articles.

The claimed deriving of NO+ from an oxide of nitrogen in a form other than nitric oxide have each been given little patentable weight, since no nexus is seen between particular processes that result in the presence of NO+ and their derivation into a nitrosonium ion and any particular, unique or distinguishable property of the optical switch device claimed.

When the reference teaches a product that appears to be the same as, or an obvious variant of, the product set forth in a product-by-process claim although produced by a different process. See In re Marosi, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983) and In re Thorpe, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). See also MPEP § 2113.

When the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to applicant to establish that their product is patentably distinct and not the examiner to show the same process as making. *In re Brown*, 173 USPQ 685 and *In re Fessmann*, 180 USPQ 324.

Newly submitted claim 23 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: The new claim is directed to composition limitations that are unrelated to limitations previously considered with respect to any of the existing pending claims concerning non-covalent forces, shape of cavity, 1,3 cone or alternate conformation and formation of nitrosonium cations.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 23 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Applicant's arguments filed on February 9, 2007, have been fully considered but they are not persuasive. It is argued that Lamartine does not disclose complexing of nitrogen oxides that produce nitrosonium oxides. It is submitted that the instant claims do not contain any limitation directed to producing of nitrosonium oxides, by nitrogen oxides or by any other mechanism.

It is argued that Batelaan does not disclose complexing, instead teaching a chemical nitration reaction and does not teach reversible reactions. However, it is submitted that in disclosing formation of "guest-host" systems, Batelaan is explicitly disclosing complexing; the complexes are to an extent reversible (column 9, lines 7-10) teach a substantial decrease in the percentage of formed complex.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Drodge at telephone number 571-272-1140. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve Griffin, can reached at 571-272-1189. The fax phone number for the examining group where this application is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either private PAIR or Public PAIR, and through Private PAIR only for unpublished applications. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have any questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JWD

March 20, 2007

JOSEPH DRODGE
PRIMARY EXAMINER